

Concept Design

The Avenida de la Playa Project was turned over to E&CP-PITS before this report was finalized. The intent of presenting the concept design in this report is to document the project as a FY2009 Watershed Capital Project.

The existing storm drain system within Avenida de la Playa discharges to the beach just west of Avenida de la Playa through a double 51-inch concrete pipe headwall and attached concrete structure. The invert elevation of the existing storm drain system at this outfall location is approximately equal to the elevation of mean sea level, and thus the outfall is typically blocked by beach sand except when cleared by City crews or by a large storm event (Figure 3-14).

In the existing condition, water enters this storm drain system during dry weather from three locations: 1) from upstream dry weather flows due to over-irrigation, car washing, etc., 2) from groundwater seepage into the system at the storm drain pipe joint locations, and 3) from inflow of seawater at the outlet structure during high tides or periods of large wave activity that cause wave run-up to the outlet location. The City previously constructed a dry weather diversion structure within this storm drain system near the Avenida de la Playa and El Paseo Grande intersection. Subsequently, dry weather flows from the majority of the upstream watershed are intercepted prior to the beach outfall and are diverted to the sanitary sewer system.



Figure 3-14. Existing Storm Drain Outlet at Avenida de la Playa

However, between the low flow diverter and the outfall, water continues to enter the system and collects and stagnates at the outfall resulting in a potential bacteria source. It is an identified source of bacterial discharge to the beach when wet weather flows force the stagnant water from the outfall location to the ocean.

To eliminate stagnant dry weather flows, this concept design includes construction of an additional dry weather diverter located at the beach outfall. A new dry weather diverter would provide that dry weather runoff and flows seeping in to the downstream end of the system at the outfall could be pumped to the sanitary sewer, thus eliminating prolonged stagnation at the outfall and subsequent bacterial growth. The dry weather diverter would not operate during rainfall. Alternatively, the pump could be equipped with a valve that would switch from discharging to the sewer system during dry weather, to discharging to the beach during wet weather, thus minimizing the volume of wet weather runoff entering the sanitary sewer system. The diverter could also be manually disabled during anticipated extreme high tides and high wave activity. The Avenida de la Playa concept design also includes replacement of approximately 1,304 linear ft of the existing storm drain system between the beach outfall and the existing upstream dry weather diverter with a new RCB culvert. Construction of the RCB culvert would have no porous joints and would therefore eliminate the infiltration of groundwater into the storm drain system. The new outfall would also include a system of

removable louver plates that would permit storm flows to exit the drainage system but restrict the ability of sand and seawater to enter the system through the outfall.

During final design, engineers should explore the possibility of raising the storm drain invert elevation so that the RCB culvert forms the street driving surface. Raising the invert will decrease the frequency of seawater entering the system via the outfall due to extreme high tides or wave run-up.

Drainage Area Limits—The existing storm drain system within Avenida de la Playa drains a tributary watershed of approximately 844 acres. The downstream end of the system is located at the western end of Avenida de la Playa adjacent to the boat launch and consists of a double 51-inch concrete pipe headwall and attached concrete structure, which is designed to keep beach sand from entering into the system. The invert elevation of the existing storm drain system at this outfall location is approximately equal to the elevation of mean sea level, and thus the outfall is typically blocked by beach sand except when cleared by City crews or by a large storm event.

Project Coordination—Over the course of this project WESTON coordinated with the City. A concept design was initiated by WESTON, however, initial site reconnaissance indicated the presence of additional utility lines that were previously unknown. Therefore, the project design has been modified to account for existing site conditions. At the time of this report, the City indicated that additional infrastructure upgrades are being planned for this street and these projects can be coordinated with the dry weather diversion concept design project. The Proposition 84 Grant has not been initiated at this time. The Grant Project has specific schedule requirements that need to be considered in the design and implementation of this project.

Performance Specification—The project goal is to construct a new drainage system and dry weather flow diverter. The combined capacity of the drainage system and the street should be capable of conveying the 100-year design storm peak runoff without flows exceeding the top of curb elevation, with the drainage facility capable of conveying the entire 50-year peak flow rate. The dry weather flow diverter should convey dry weather flows to the sanitary sewer, thus preventing stagnation of collected flows and subsequent bacterial growth at the storm drain outfall. A main component of the new system is also a series of removable louver plates that would permit storm flows to exit the drainage system but would restrict the ability of sand and seawater from entering the system through the outfall. Please refer to the Avenida de la Playa Storm Drain Replacement Concept Plan sheets 1 through 3 of 3.

O&M—It is anticipated that regular maintenance of the dry weather diverter system will include removal of trash and leaf litter. The new RCB outfall should be relatively maintenance free, although occasional clearing of debris conveyed from the upstream watershed may be required should the debris hold one of the rotating louvers in the open position or become caught on the louvers. The RCB storm drain itself should require minimal maintenance. Maintenance of the entire system will vary year to year based on rainfall frequency.

Estimated Construction Cost—The estimated construction cost is approximately \$2,593,878. This includes labor and materials, final engineering, mobilization, traffic and erosion control, miscellaneous landscaping, minor utility relocation, and a 20% contingency but excludes City staff costs associated with construction inspection and project management/review.

Performance Specifications

The goal of the low-flow diversion structure concept design will be to intercept and divert 100% of the dry weather flows discharging to the Mission Bay (La Jolla Area of Special Biological Significance) Watershed from the outfall located on the beach just west of Avenida de la Playa. The goal replacing 1,304 linear ft of existing storm drain pipe with new RCB culvert will be to prevent the infiltration of groundwater into the MS4, while maintaining the original objective of conveying wet weather storm water discharges to the ocean. The goal of the outfall design will be to restrict the ability of sand and seawater from entering the MS4 through the outfall.

GENERAL

Unless otherwise indicated herein, work shall be done in accordance with the SDRSD, latest approved edition.

Existing utilities shall be protected in place unless otherwise noted in construction drawings, as directed by the Design Engineer. All existing surface improvements disturbed during construction shall be repaired to the existing pre-construction condition.

It is recommended that, as part of the final design, a drainage report be completed to verify drainage areas, flow rates and existing storm drain configurations and a geotechnical report be completed to verify site conditions pertaining storage tank construction and groundwater levels.

Project treatment components shall be designed to remove bacteria, a priority pollutant of concern in the Mission Bay and La Jolla WMA and eliminate the discharge of dry weather flows to the ASBS in accordance with the Draft Ocean Plan exception process permit. The system shall be designed to achieve a 99% reduction in bacteria for the treated flow in accordance with the final wet weather objective in the Bact-I TMDL.

LOCATION 1 – REPLACE EXISTING MS4 ALONG AVENIDA DE LA PLAYA

1. STORM WATER CONVEYANCE

Existing storm drain conveyance, consisting of 635.3 ft of 51-inch RCP, 648.0 ft of 72-inch RCP, headwalls and transition structures, shall be removed and replaced with approximately 1,304 of double RCB culvert. The purpose of this new storm drain conveyance is to convey storm water discharges and prevent groundwater infiltration by creating a continuous system.

The storm water conveyance shall include the following criteria:

- Include 1,265 ft of standard 6-ft wide by 4.5-ft high double RCB culvert,
- Connect to the existing 72-inch RCP designated to remain in Avenida de la Playa through a RCB transition structure, approximately 30 ft in length, which is designed to connect to the new 6-ft wide by 4.5-ft high double RCB system,
- Include 9 ft of modified RCB outlet structure designed to house the diversion structure (see outlet structure notes in Item 2, OUTLET STRUCTURE performance specifications below),
- Include at least two flow equalizations windows and manhole access points as called out in Avenida de la Playa Storm Drain Replacement Concept Plan Sheet 1 of 3,
- Be designed for gravity flow,

- Have a hydraulic capacity sufficient to convey the volume of equal or greater to the existing RCP culvert, and
- Be installed as indicated on the concept design plan.

During final engineering design, the Design Engineer should explore the possibility of raising the storm drain invert elevation such that the RCB forms the street driving surface.

2. OUTLET STRUCTURE

The existing headwall at the outfall location on La Jolla Shores Beach shall be removed and replaced with a RCB headwall and appurtenances. The outlet structure shall incorporate a dry weather flow diversion system designed to divert dry weather flows, but allow wet weather flows to discharger to the beach.

The outlet structure shall include the following criteria:

- Have an open space of at least 8 linear ft in length,
- Include a 1-ft thick concrete cutoff wall,
- House a dry weather diversion structure:
 - The dry weather diversion structure shall be protected by well screen and steel grate. The screen and grate must be removable by City staff during periodic O&M efforts.
 - The dry weather diversion structure shall be equipped with a hydrodynamic duplex package pump unit with two standard fitted submersible pumps, Model OSP50AB-2. Pump motors shall be at least ½ HP, 1750 RPM 230/1/60;
- Have an exterior, street level duplex controller, Type ½ HD, 230/1/60, level switch, and an alternating pump activation circuit for the dry weather diversion system:
 - These systems shall be housed in a NEMA III Type enclosure.
 - A manual switch designed to discontinue discharges to the MS4 system may be incorporated into the final engineering design based on the discretion of the Design Engineer,
- Include removable, rotating louver plates to prevent sand and ocean water from entering the outlet structure,
- Include a removable deck on top of the outlet structure to provide a public walking surface. Deck shall include an access door to the outlet structure,
- Include a decorative exterior finish matching in design and color to the comfort station immediately to the north of the project location, and
- Undergo final design as called out in Avenida de la Playa Storm Drain Replacement Concept Plan Sheet 2 and Sheet 3 of 3.

Estimated Cost

City of San Diego FY2009 Concept BMP Design Cost Estimate for Dry Weather Diversion and Storm Drain Replacement in Avenida De La Playa March 2010					
Item	Description	Unit	Qty	Unit Cost	Total
1	Saw cut (each side of demo area)	LF	2,590	5.12	\$13,261
2	Demo - remove existing pavement 22' width	SF	28,489	3.36	\$95,723
3	Demo - remove existing headwall structure	EA	1	5,000.00	\$5,000
4	Demo - remove existing double 51" RCP storm drain	LF	635	28.00	\$17,788
5	Demo - remove existing transition structure	EA	1	2,500.00	\$2,500
6	Demo - remove existing 72" RCP storm drain	LF	648	18.00	\$11,664
7	Demo - remove existing concrete sidewalk & curb	LF	200	23.00	\$4,600
8	Construct RCB headwall and appurtenances	EA	1	10,000.00	\$10,000
9	Construct dry weather diversion pump and controls	EA	1	25,000.00	\$25,000
10	Construct PVC diversion line	LF	136	98.00	\$13,328
11	Construct double 6' high x 4.5' wide RCB	CY	2,197	590.00	\$1,296,230
12	Construct transition structure	EA	1	10,000.00	\$10,000
13	Construct RCB manhole and flow equalization window	EA	3	2,500.00	\$7,500
14	Construct concrete sidewalk	SF	1,900	8.00	\$15,200
15	Construct concrete curb and gutter	LF	200	34.00	\$6,800
16	Structural backfill for double 6' high x 4.5' wide RCB	CY	3,212	11.50	\$36,938
17	Repave over new construction.	SF	28,489	4.75	\$135,323
18	Slurry seal width of street	SF	28,489	0.99	\$28,204
19	Miscellaneous surface improvements and landscaping	EA	1	100,000.00	\$100,000
20	Miscellaneous utility relocation	EA	1	100,000.00	\$100,000
21	Traffic control	EA	1	20,000.00	\$20,000
22	Erosion control	EA	1	10,000.00	\$10,000
Construction Subtotal					\$1,965,059
Final Engineering Design (6% of construction subtotal)					\$117,904
Mobilization (6% of construction subtotal)					\$117,904
Contingency (20% of construction subtotal)					\$393,012
Construction Total					\$2,593,878